



NASA IT: Transformation Enables NASA Missions

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Office of the Chief Information Officer



NASA Overview



- NASA: 10 field centers plus additional component facilities located worldwide.
- The NASA team is comprised of more than 17,000 civil servants and more than 60,000 contractors.



Every day, NASA personnel, contractors, academics, and members of the public access some part of NASA's information technology (IT) infrastructure – a complex array of more than 500 information systems with over 140,000 devices geographically dispersed around the globe and in orbit.



Information Technology & the NASA Mission



It's a great time to be a
CIO: Information
Technology, Data, and
Cybersecurity is
foundational to mission
success.



About NASA Office of the CIO

The NASA Office of the Chief Information Officer is responsible for NASA IT policy and operations.

- 10 Centers
- 3 Divisions
- 8 Agency-level offices
- 6 Service lines
- Nearly 800 civil servants and hundreds of contractors





OCIO Services and Scope

Workplace & Collaboration Services

- ▶ 83k+ Devices & Services
- ▶ 49k+ Laptops and Desktops
- ▶ 15k+ Mobile Devices
- ▶ 13k+ Software Licenses

Cybersecurity Services

- ▶ Cybersecurity for 275k+ Devices
- ▶ 800+ System Security Plans & Authorizations to Operate

Applications & Platform Services

- ▶ 4.4k+ Applications (Agency and Center)
- ▶ 40+ Robotic Process Automations

Cloud & Computing Services

- ▶ 1.7M Hours of Cloud Computing per Month (avg)
- ▶ 19k TB of Data in the Cloud and 30k+ TB of Data in 12 Data Centers
- ▶ 2.5k+ Physical Servers & 7,000+ Virtual Servers

Information, Data & Analytics Svc

- ▶ ~55k Data Assets on data.nasa.gov
- ▶ ~28k of these Data Assets Shared Publicly
- ▶ Sharing 570+ Archives of SW Source Code

Comms Services

- ▶ 35k+ Daily Remote Workers
- ▶ 4.5k+ Network Devices
- ▶ 79k+ Telephones with 62k+ using VoIP



NASA OCIO Enables All NASA Missions



**HEO Exploration
Systems Dev't**



**HEO Space
Operations**



Aeronautics Research



Science



Space Technology

NASA's work is primarily structured within these Directorates.



NASA OCIO Transformation: In Progress

Why



What

The OCIO Transformation is a **redesign of the Agency's IT Operating Model** in order to more directly enable NASA to achieve mission success and ensure that the OCIO is an organization where our people grow, learn, and thrive. Notable changes to the IT Operating Model include, but are not limited to, the OCIO's organizational structure, governance boards and processes, the IT acquisition strategy and contract management, optimizations to resource and budget management, and new approaches to improving customer experiences.



Key Changes to NASA's IT Operating Model

Customer Experience



- A focus on creating and enabling easy-to-use, 'effortless' experiences for all audiences internal and external
- Deploying a new "Front Door" to IT services for NASA
- Establishing defined relationship management roles and community to improve integration with and responsiveness to our Mission customers

Service Delivery



- Adoption of new organizing principles (Service Lines) integrating and aligning current disparate and duplicative organizations and communications
- Implementing new methods (ITIL4, Agile, and DevOps) to drive business outcomes and enable IT as a strategic partner
- Shift from a focus on systems to platforms and agile, cost-effective methodologies leveraging automation and the cloud

Organizational Change & Workforce Development



- Reorganizing the OCIO organizations and workforce to One OCIO from 10 different, independent IT organizations
- Establishing consistent roles and communities of practice to
- Intentionally developing workforce management practice inclusive of succession planning, "Complete IT Professional" career path, and more



Run IT Like a Business

- Centralizing budgets for IT services provided as base capabilities to NASA
- Distributing budgets for consumption-driven IT services to the organizations with requirements
- Streamlined financial and budgeting process to accelerate decision making and reduce barriers to service
- Improving business alignment through strategic planning and enterprise architecture
- Transitioning from multiple, geographically distributed IT contracts to flexible, centralized Agency IT contracts
- Implementing revised and new Risk Management, Performance Management, and Governance frameworks
- Reducing bureaucracy and constraints through a reduction of disparate policies



NASA OCIO – Mission Partnerships

Mission Challenge

- Information technology became a critical path enabler of mission success for work on the Space Launch System (SLS) core stage at NASA's New Orleans Michoud Assembly Facility (MAF).
- The on-the-floor, physical manufacturing operation was dependent on network and end-user devices to manage manufacturing processes and design documentation.
- While this was naturally a technology focused activity, many “soft” activities like collaboration, teaming, iterative design, project management and many others came into play to enable success.

OCIO Response

- NASA and Boeing worked together to design and build a “partner” network. This network enclave enabled the kind of access Boeing required but also featured the cyber protections essential for NASA.
- The manufacturing process required increased bandwidth and the total network capacity at MAF was increased 90% in some segments over these past three years.
- NASA and Boeing also placed IT support personnel on the manufacturing floor to facilitate collaboration. NASA & Boeing IT personnel continue to sit side by side on the manufacturing floor today.
- OCIO-enabled IT and process innovations followed the SLS core stage to NASA Stennis for engine testing and to NASA Kennedy in preparation for launch.



Agency Digital Transformation

Enduring Bold Mission



Now in Changing World

NASA must transform...



the way
we
WORK



the experience
of our
WORKFORCE



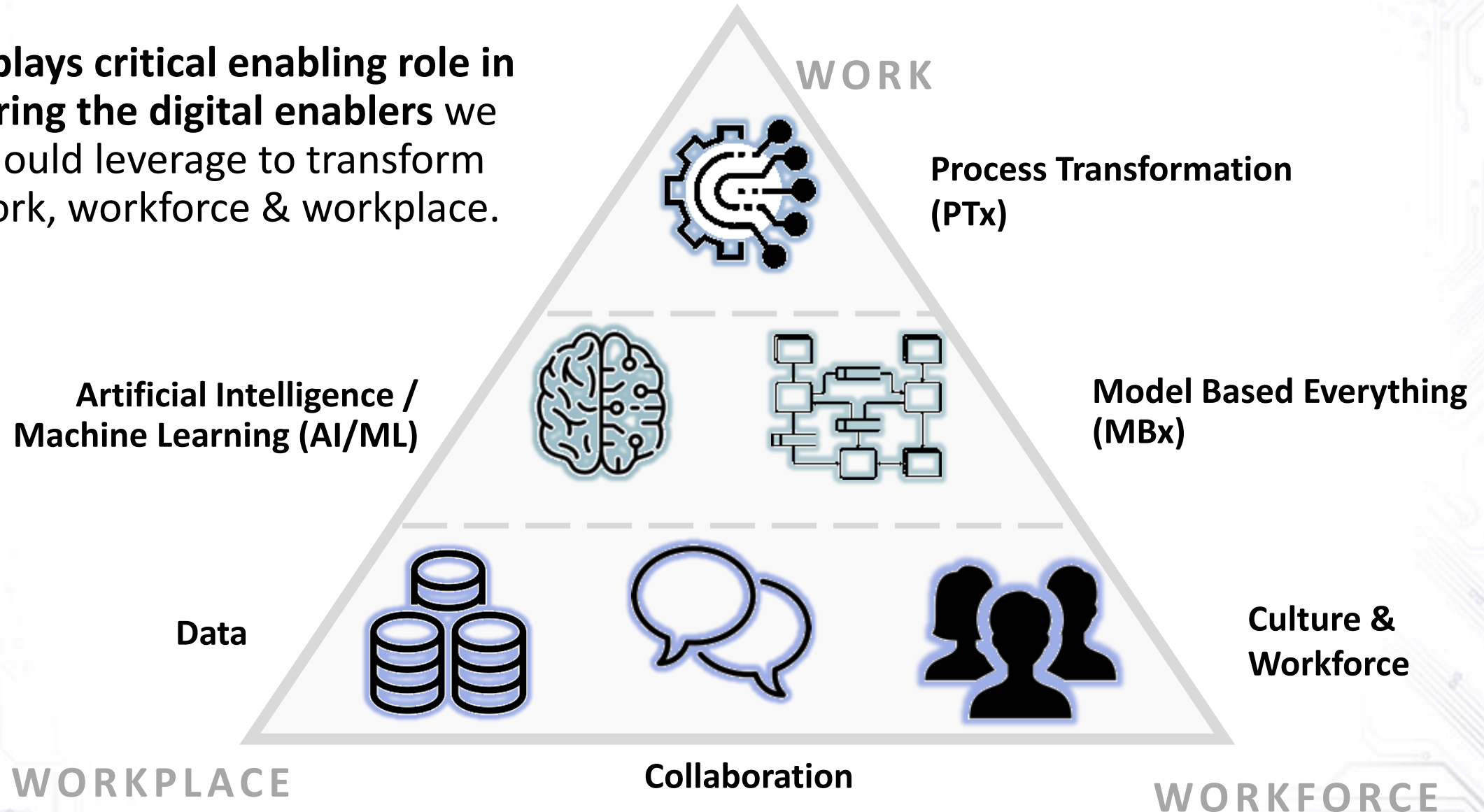
the agility
of our
WORKPLACE

...digital advances can/will get us there



Digital Foundations

OCIO plays critical enabling role in delivering the digital enablers we can/should leverage to transform our work, workforce & workplace.





DT is about Mission Transformation

December 2021: First US AI/ML model on the International Space Station

AI/ML prototype performed diagnostics and generated a GO/NO-GO recommendation on the glove condition in **45 seconds**, a process that normally is performed by a group of people taking multiple days.





NASA's Wallops Launch Complex *(and a New Zealand Connection...)*

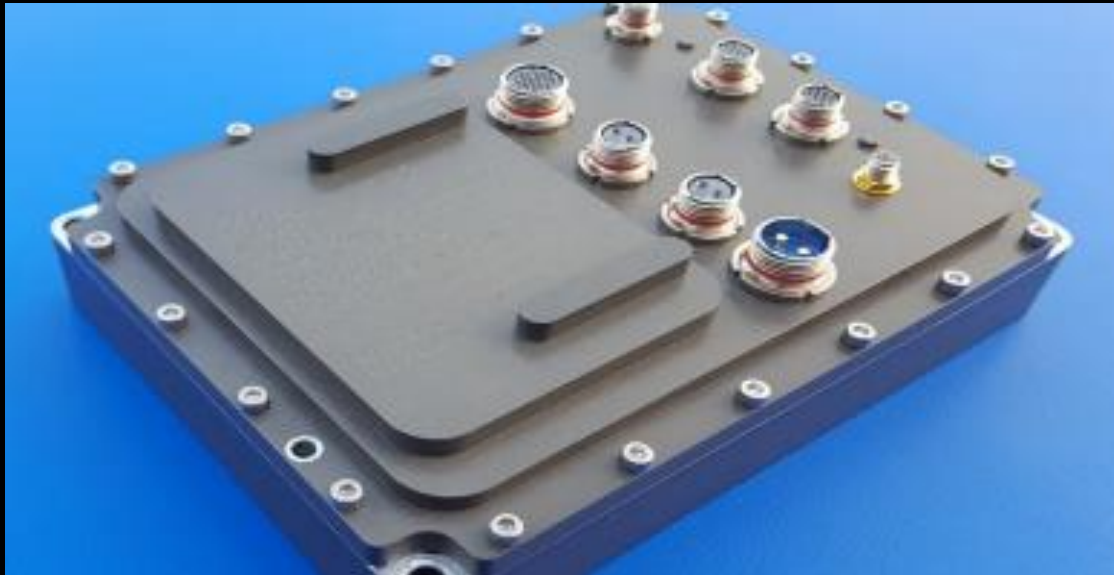
On the Eastern Shore of Virginia, NASA is working with Rocket Lab to exploit the growing capabilities of small launch vehicles and small spacecraft. As these new tools to power innovation, they also reduce risk and cost of technology infusion into future NASA science missions. Rocket Lab already has a launchpad for their Electron rocket at Wallops.





The NASA Autonomous Flight Termination Unit (NAFTU)

The NASA Autonomous Flight Termination Unit (NAFTU) is a game changing technology that will expand launch capabilities for the commercial launch industry. GSFC is developing the NAFTU software to enable Rocket Lab to launch at WFF. The next version of the NAFTU software will be released to Rocket Lab and the launch industry in March 2022. The first Rocket Lab Electron launch is expected from Wallops in Q4 2022.





Rocket Lab's Neutron Launch Vehicle at Wallops



- Neutron! Rocket Lab's new, medium-lift class launch vehicle
- Coming to NASA Wallops in 2024
 - Height: 40 m (131 ft) comparable to an Antares rocket
 - 8,000 kg to low-Earth orbit
 - 2,000 kg to the Moon
 - 1,500 kg to Mars, Venus
 - Reusable

Rocket Lab is building a new launch pad and a 250,000 square-foot manufacturing and operations facility, including launch control in Virginia.



Rocket Lab CEO Peter Beck and the Neutron fairing



QUESTIONS